

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows. The following listing of claims will replace all prior versions and listing of claims in the application.

1. – 25. (cancelled)

26. (cancelled)

27. (amended) A method of Claim 59 26, wherein said intermetallic component comprises a transition metal.

28. (previously added) A method of Claim 27, wherein said intermetallic component comprises a first row transition metal.

29. (previously added) A method of Claim 28, wherein said intermetallic component comprises a metal selected from the group consisting of nickel, iron, copper, and mixtures thereof.

30. (previously added) A method of Claim 29, wherein said intermetallic component comprises Cu₆Sn₅.

31. (previously added) A method of Claim 29, wherein said intermetallic component comprises Ni₃Sn₄.

32. (previously added) A method of Claim 29, wherein said intermetallic component comprises FeSn₂.

33. (amended) A method of Claim 27, wherein said intermetallic component ~~additionally~~ comprises a metal which is a component of said matrix solder.

34. (amended) A method of Claim 59 26, wherein said matrix solder is a lead-free eutectic or near-eutectic solder.

35. (previously added) A method of Claim 34, wherein said matrix solder is a binary or ternary solder.

36. (previously added) A method of Claim 35, wherein said matrix solder is 96.5 Sn/3.5 Ag.

37. (amended) A method of Claim 65 26, wherein said intermetallic component comprises about 20% by volume of said composite solder.

38. (cancelled)

39. (cancelled)

40. (cancelled)

41. (amended) A method of Claim 59 26, wherein said cooling step comprises cooling by spat quenching, spray atomization, or by continuous casting into a sold form.

42. (cancelled)

43. (amended) A method of Claim 60 42, wherein said intermetallic component comprises a first row transition metal.

44. (previously added) A method of Claim 43, wherein said intermetallic component comprises a metal selected from the group consisting of nickel, iron, copper, and mixtures thereof.

45. (previously added) A method of Claim 44, wherein said intermetallic component comprises a compound selected from the group consisting of Cu₆Sn₅, Ni₃Sn₄, FeSn₂, and mixtures thereof.

46. (previously added) A method of Claim 43, wherein said intermetallic component additionally comprises a metal which is a component of said matrix solder.

47. (amended) A method of Claim 60 42, wherein said matrix solder is a ~~lead free~~ eutectic or near-eutectic binary or ternary solder.

48. (previously added) A method of Claim 47, wherein said matrix solder is 96.5 Sn/3.5 Ag.

49. (cancelled)

50. (cancelled)

51. (cancelled)

52. (amended) A method of Claim 60 42, wherein said cooling step comprises cooling by spat quenching, spray atomization, or by continuous casting into a sold form.

53. (cancelled)

54. (amended) A method of Claim 61 53, wherein said particle size is less than 5 microns.

55. (previously added) A method of Claim 54, wherein said particle size is less than 2 microns.

56. (amended) A method of Claim 61 ~~53~~, wherein said intermetallic component comprises ~~(a) a metal which is a component of said matrix solder, and (b)~~ a metal selected from the group consisting of nickel, iron, copper, and mixtures thereof.

57. (previously added) A method of Claim 56, wherein said intermetallic component comprises a compound selected from the group consisting of Cu₆Sn₅, Ni₃Sn₄, FeSn₂, and mixtures thereof.

58. (previously added) A method of Claim 57, wherein said matrix solder is 96.5 Sn/3.5 Ag.

59. (new) A method for producing an *in-situ* composite solder having an intermetallic component, comprising the steps of:

- providing a mixture comprising the components of a eutectic or near-eutectic matrix solder and the components of an intermetallic component;
- heating said mixture so as to melt all components of said mixture forming a non-solid mixture; and
- cooling said non-solid mixture at a rate sufficiently fast so as to form a solder wherein intermetallic components having a particle size of less than about 10 microns are homogenously distributed throughout said matrix solder.

60. (new) A method for producing an *in-situ* composite solder having an intermetallic component, comprising the steps of:

- (a) providing a mixture comprising the components of said matrix solder and the components of said intermetallic component in amounts appropriate to form a solder having from about 5% to about 40% by volume of said intermetallic component;
- (b) heating said mixture so as to melt all components of said mixture forming a non-solid mixture; and
- (c) cooling said non-solid mixture at a rate sufficiently fast so as to form a solder wherein intermetallic components having a particle size of less than about 10 microns are homogenously distributed throughout said matrix solder.

61. (new) A method for producing an *in-situ* composite solder having an intermetallic component, comprising the steps of:

- (a) providing a binary or ternary eutectic or near eutectic matrix solder;
- (b) heating a mixture of said matrix solder with the components of a intermetallic component comprising a first row transition metal, at a temperature greater than the highest melting temperature of all of the individual components of said mixture so as to form a non-solid mixture; and
- (c) rapidly cooling said non-solid mixture;

wherein said composite solder comprises from about 5% to 40% of said intermetallic component, said intermetallic component comprises at least one element present in said matrix solder; and said intermetallic component comprises particles having a particle size of less than about 10 microns homogenously distributed throughout said composite solder.

62. (new) A method according to Claim 59, wherein said intermetallic components are less than 10 microns in size.



63. (new) A method according to Claim 59, wherein intermetallic components having a particle size of less than about 5 microns are homogenously distributed throughout said matrix solder.

64. (new) A method according to Claim 63, wherein intermetallic components having a particle size of less than about 2 microns are homogenously distributed throughout said matrix solder.

65. (new) A method according to Claim 59, wherein said intermetallic component comprises from about 10% to about 20% by volume of said composite solder.

66. (new) A method according to Claim 59, wherein said cooling is at a rate of at least about 100° C/minute.

67. (new) A method according to Claim 59, additionally comprising, after said heating step (b) and prior to said cooling step (c), the steps of cooling said mixture to form a solid, and remelting said solid at a temperature sufficient to melt all components of said solid.

68. (new) A method according to Claim 60, wherein said solder is lead-free.

69. (new) A method according to Claim 60, wherein said intermetallic components are less than 10 microns in size.

70. (new) A method according to Claim 60, wherein intermetallic components having a particle size of less than about 5 microns are homogenously distributed throughout said matrix solder.

71. (new) A method according to Claim 70, wherein intermetallic components having a particle size of less than about 2 microns are homogenously distributed throughout said matrix solder.

72. (new) A method according to Claim 60, wherein said intermetallic component comprises from about 10% to about 20% by volume of said composite solder.

73. (new) A method according to Claim 60, wherein said cooling is at a rate of at least about 100° C/minute.

74. (new) A method according to Claim 60, additionally comprising, after said heating step (b) and prior to said cooling step (c), the steps of cooling said mixture to form a solid, and remelting said solid at a temperature sufficient to melt all components of said solid.

75. (new) A method of Claim 61, wherein said intermetallic particles comprises about 10% to about 20% by volume of said composite solder.

76. (new) A method of Claim 61, wherein said cooling step comprises cooling by splat quenching, spray atomization, or by continuous casting into a sold form.

77. (new) A method according to Claim 61, additionally comprising, after said heating step (b) and prior to said cooling step (c), the steps of cooling said mixture to form a solid, and remelting said solid at a temperature sufficient to melt all components of said solid.

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